F·A·A·M facility for airborne atmospheric measurements

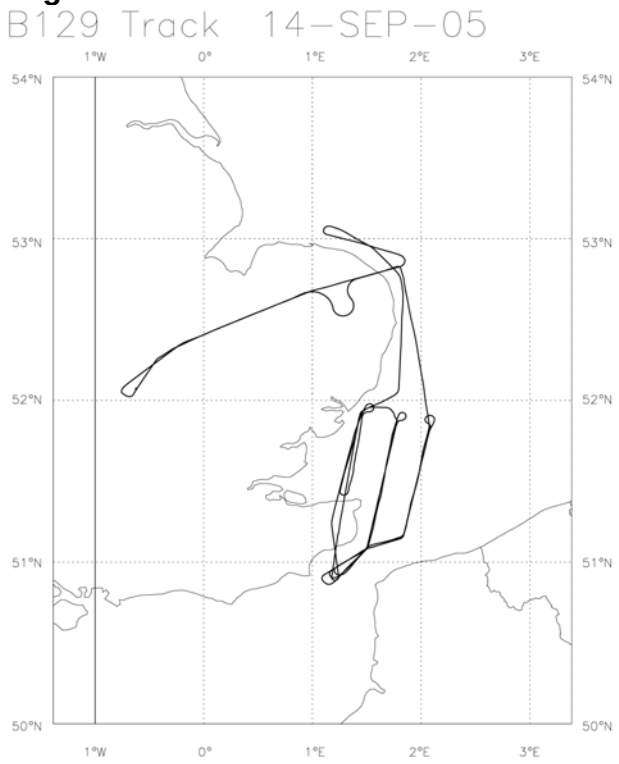
FLIGHT FOLDER

Flight No.:	B129
Date:	14 Sep 2005
Take Off	09:50:15
Landing:	14:45:17
Flight Time	4h50m02

Campaign: CLOPAP
Operating Area: Thames Estuary

POB	Position	Name	Institute
1	Captain	Al Roberts	Directflight
2	Co-pilot	Ian Ramsay-Rae	Directflight
3	CCM	Sue Angold	Directflight
4	Mission Scientist	Keith Bower	Manchester University
5	Flight Manager	Jim Crawford	FAAM
6	Core Chemistry	Ruth Purvis	FAAM
7	Cloud Physics	Jamie Trembath	FAAM
8	CCN/filters/CCM2	Paul James	FAAM
9	CVI/filters	Stuart Heath	FAAM
10	Noxy	Dave Stewart	UEA
11	PTRMS	Jenny Murphy	Manchester University
12	ADA/CPI	Martin Gallagher	Manchester University
13	WAS	Debbie O'Sullivan	UEA
14	AMS	Jonny Crosier	Manchester University
15			
16			
17			
18			
19			
20			

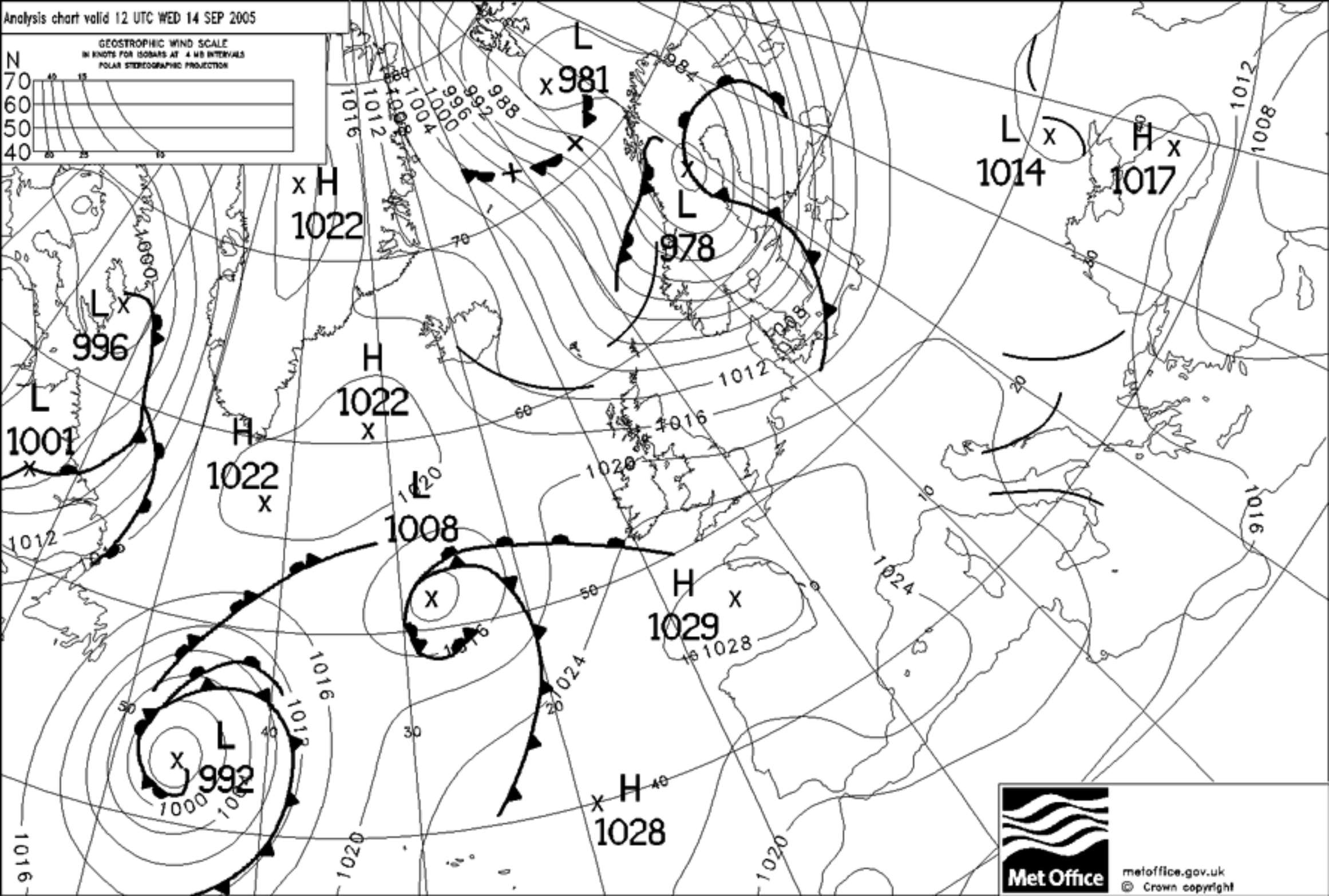
Flight Track:



FLIGHT SUMMARY

Flight No b129
Date: 14 September 2005
Project: CLOPAP
Location: Thames Estuary

Start Time	End Time	Event	Height (s)	Hdg	Comments
092525		INU	0.14 kft	125	to NAV
095015		T/O	6.7 kft	046	Cranfield
095909		TRANSIT	11.0 kft	060	FL110 cals
101200		JW / NEV	11.0 kft	070	zeros
101737	103252	Profile 1	11.0 - 0.32 kft	288	
101929		video	9.3 kft	287	FFC & RFC no 1 started
102359		profile interrupted	5.0 kft	287	
102558		profile 1	5.1 kft	110	recommenced
103027		profile 1	1.5 kft	141	interrupted
103046		profile 1	1.5 kft	141	recommenced
103210		wp 40	0.70 kft	144	
103304	104908	Run 1	0.30 - 0.29 kft	168	
104946	105831	Run 2	0.31 - 0.27 kft	195	
105957	110725	Run 3	0.25 - 0.28 kft	006	
111040	112823	Run 4	2.1 kft	210	2300ft
112513		video	2.1 kft	178	FFC & RFC tapes 2
113047	113253	Profile 2	2.1 - 4.0 kft	002	2300ft > fl60
113253	114607	Run 5	4.0 kft	002	
115107	115815	Run 6	3.1 kft	209	wp 41 > wp 42
115916	120915	Run 7	2.4 - 2.5 kft	196	
121108	121919	Run 8	2.1 kft	048	
121919	122827	Run 9	2.1 kft	013	
122908		video	3.2 kft	007	FFC & RFC tape 3 started
123323	125327	Run 10	2.4 kft	205	C to D 2300ft
124537		wp Delta	2.4 kft	219	
125529	125934	Run 11	2.4 kft	043	
125934	131157	Run 12	2.4 - 2.3 kft	008	
131616	132956	Run 13	0.28 - 0.23 kft	201	wp 41 to wp 42 - 500 ft wp 42 500ft
132957	133432	Run 14	0.23 - 0.22 kft	222	wp 42 500ft
133147		video	0.20 kft	240	FFC & RFC tapes 4 started
133908	134326	Run 15	0.24 - 0.21 kft	041	towards wp 42 at 500ft 133610
134013		wp 42	0.24 kft	065	
134327	135420	Run 16	0.21 - 0.26 kft	020	
135432	141107	Run 17	0.29 - 0.34 kft	349	
135443		wp Charlie	0.27 kft	347	
144517		Land	0.14 kft	306	Cranfield
145616		GPS	0.14 kft	306	52'04.36 N 0'37.50W
145728		INU	0.14 kft	306	52 03.58 N 0 37.98 W


Analysis chart valid 12 UTC WED 14 SEP 2005
GEOSTROPHIC WIND SCALE
IN KNOTS FOR ISOBARS AT 4 MB INTERVALS
POLAR STEREOGRAPHIC PROJECTION
N
70
60
50
40
L 981
H 1022
L 978
L 1014
H 1017
L 996
L 1001
H 1022
H 1022
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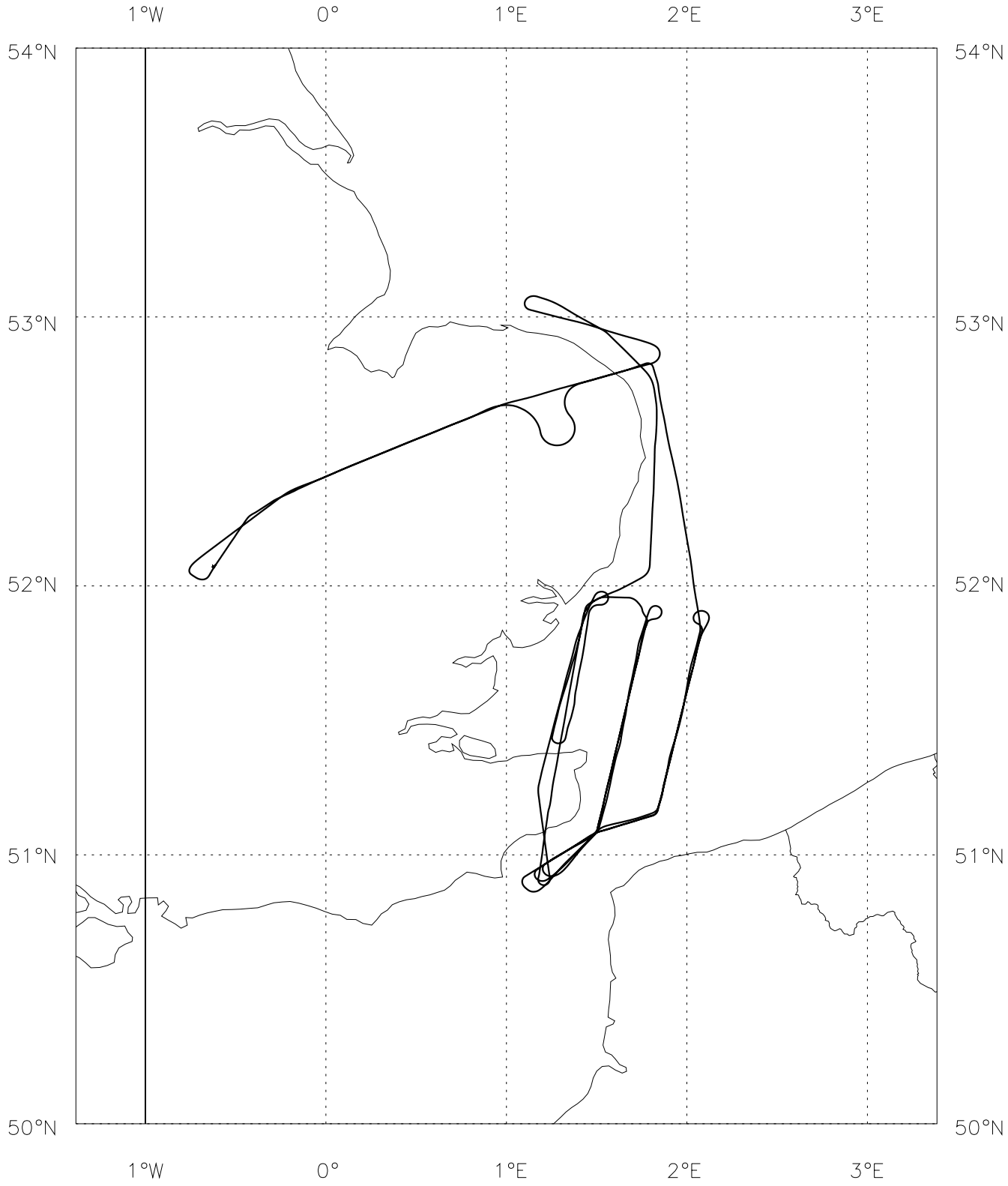
B129 Track 14-SEP-05



Sortie Brief: CLOPAP 7 (draft 1 : prepared by K.N. Bower/M.W.Gallagher)

Flight Number : B129
Date: Wednesday 14th September 2005 **Mission Scientist: Keith Bower**

CLOPAP Sortie Aims:

To study the evolution of aerosol in an urban plume as it advects away from the source. To investigate the interaction of the aerosol and gases with cloud both as the aerosol/gas modifies the cloud microphysics and the cloud modifies the aerosol and gases.

CLOPAP Sortie Location:

The plan is to fly in an area of low cloud and sample pollution from a major urban area as it advects towards and interacts with the cloud layer. Because of operating restrictions in the North Sea off the coast of northern England, the only viable option today is to sample the London plume SE of London in a NW over Kent and into the English Channel. Low cloud is forecasted in this region and in the English Channel. In cloudy conditions, several sets of cross-wind runs of 12 minutes duration (or of half this duration on reciprocal headings) will be attempted at various altitudes in the time available. This may be adjusted by the mission scientist omitting parts of these sets of runs to best achieve the science goals in the conditions encountered. Current plans and flight level restrictions allow for three sets of runs to be carried out consisting of up to four runs per set. The furthest downwind set of cross wind legs will be conducted in the English Channel the position being dictated by airspace restrictions. Profiles will be carried out where possible in each set of runs

CLOPAP Sortie Summary:

The case studies will be carried out by flying a series of up to 84 km# transects across the plume within the boundary layer (one below cloud, and at least one in cloud) and one in the lower free troposphere immediately above cloud top. Each of these sets of transects will be immediately preceded by a vertical profile (where possible) extending into the lower free troposphere starting from as close to the surface as possible. These profiles will establish the vertical mixing and structure of the sampled air and establish the optimum altitudes for the following transects. This flight pattern will be repeated at intervals of about 25km# separation, to obtain up to 4 sets# of transects. Although we are not aiming to perform a comprehensive Lagrangian study, this flight plan will allow us to approximately track the same air as it is advected downwind of the source region. Runs at each altitude may be cut down to a minimum total length of 12 minutes (or 84km) duration or omitted, or certain profiles sacrificed in order to achieve the required study of plume evolution and interaction with cloud. In the absence of cloud, fewer boundary layer transects will be performed, ie the “in-cloud” leg (and some profiles) will be omitted, and the spacing between sets of legs reduced so as to carry out more sets of runs (and hence improve detection of clear-air plume evolution) in the operational area.

CLOPAP Sortie Detail: PTO

Sortie Brief: CLOPAP 7 (draft 1 : prepared by K.N. Bower/M.W.Gallagher)

Flight Number : B129
Date: Wednesday 14th September 2005 **Mission Scientist: Keith Bower**

CLOPAP Sortie Detail:

1. Take off and climb to FL 110 for transit at cruise speed to operating area (with appropriate time [~20mins] spent carrying out NOxy calibration at that level)
2. When downwind of chosen urban source, descend to minimum safe altitude below cloud. Perform a profile ascent by climbing at 1000 ft per minute to pass through cloud and to an altitude 200 ft above cloud top/ boundary layer top.
3. Descend to below cloud base, proceed across wind in the boundary layer until outside the plume as detected by CN counter/gases. Mission scientist to announce out of cloud transect. Perform a straight and level run (SLR) below cloud base (200 ft below cloud base) across wind and of length 84 km#. CCN measurements should commence at the start of this run. Core Chemistry calibrations should be carried out at start of run (as required) and completion announced so that WAS sampling can begin.
4. Ascend to the middle of the cloud layer. Turn through 180 degrees. Mission Scientist to announce in cloud transect (AMS to switch to CVI inlet) and perform SLR of length 84 km#.
5. Ascend to 200 feet above cloud top turn through 180 degrees - mission scientist to announce out of cloud transect (AMS to return to Rosemount inlet). Perform a SLR of length 84 km#. CCN measurements should also commence at the start of this run.
6. Ascend to cruising altitude to transit to 50 km downwind and repeat steps 2 to 6
7. Continue repetitions until available flight time in science area is exhausted
8. Climb to transit level to return to home base (with appropriate time [~20mins] spent at FL100 for NOxy calibration)

<u>NB. In the absence of cloud:</u>

9. In the absence of cloud steps 3 and 4 will be replaced by a single in boundary layer cross-wind transect, and the transit distance between sets of runs in item 6 will be reduced to 25km to enable more sets of cross wind runs to be carried out.

Sortie Brief: CLOPAP 7 (Interaction of pollutant aerosol with warm cloud) : TWC/KNB

CLOPAP Scientific Aims

1. To investigate the evolution of an urban plume as it is advected away from the source in cloudy conditions (if low cloud in this area)[#]. Changes in chemical speciation and the partitioning of species between the gas and particulate phases will be investigated.
2. To measure the changes in the size distribution and Cloud Condensation Nucleus (CCN) activity spectrum of the aerosol.
3. To measure changes in cloud microphysics as the aerosol properties in the plume, particularly those of the sub-set of aerosol acting as CCN.
4. To investigate the differences in the composition of aerosol that form cloud droplets and those that remain unactivated and interstitial to the cloud, and to observe how this changes as the plume ages.
5. To investigate the role of vertical exchange between the boundary layer and the free troposphere to understand its effect on the transport of aerosols and trace gases on the cloudy plume.

CLOPAP Weather Conditions

Ideally, a stratocumulus capped boundary layer forming over the sea downwind of a main source of urban air pollution. Limited convective penetration of the boundary layer top is acceptable (but not deep convection). The cloud cover should exceed 70% in the study areas.

CLOPAP Key Measurements requiring operator intervention during flight

Cloud Physics

- **FFSSP, 2DC, 2DP, PCASP**, Normal monitoring to ensure correct operation. Operator should note particular features of interest eg. high/low concentrations,
- **ADA and CPI** – as above
- **CCN** - alleviator should be filled whilst in clear air either below, or upwind of the cloud layer(s) of interest. 1 sample and spectrum per run, if possible.
- **J-W LWC and Nevzorov LWC/TWC**. Where run is only partially in cloud and starts in clear, these should be zeroed/calibrated and logged by Flight Manager.
- **TWC** – initial profile should avoid cloud, if possible, to achieve good calibration.

Chemistry Measurements

WAS - 2 bottle samples per 84km flight leg unless otherwise notified by the Mission Scientist (first sample to be collected after core chemistry calibrations are completed).
NOxy, Ozone, SO2, CO, PTRMS, Hydrogen peroxide to operate continuously.
AMS - to be operated on **Rosemount inlet** out of cloud, **CVI** inlet in cloud. The inlet should be kept closed to avoid contamination whilst the GPU is operating prior to takeoff. It may be opened once the GPU has been removed or after take-off. Similarly, intake should be closed before GPU is started post-flight or before landing.
Filters – these should be exposed on boundary layer out of cloud runs.

Video – the default recording setup should be forward and rearward facing.

CCN measurements :alleviator should be filled at the start of cloud free passes.

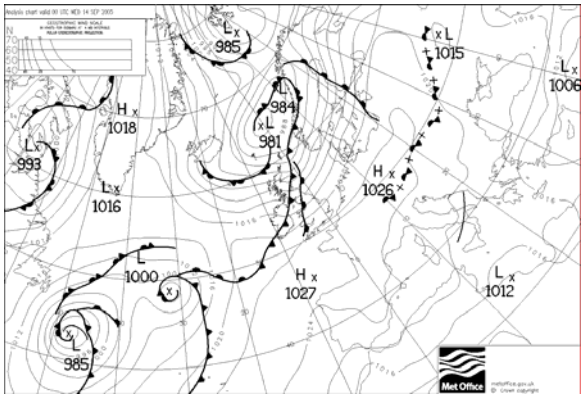
Bottle filling and **filter sampling** should occur in clear air transects only. Two[#] bottle samples should be filled during each boundary layer transect and 1 during the free troposphere transect. The Mission scientist will indicate when in plume using CN and selected gas measurements. All other instruments should run continuously.

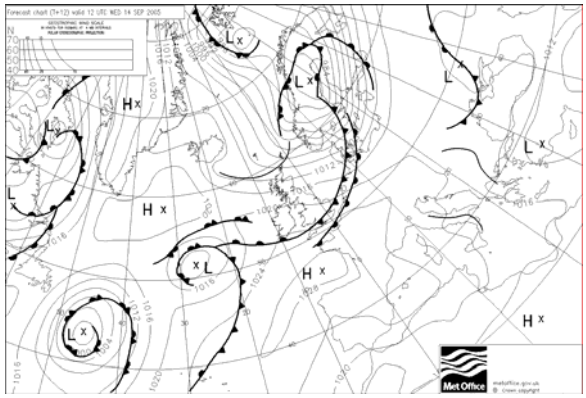
Sortie de-brief: **CLOPAP 7** **Flight Number: B129**
Date: 14th September 05
M.Sci: Keith Bower

Sortie Aims: To study the evolution of aerosol in an urban plume as it advects away from the source. To investigate the interaction of the aerosol and gases with cloud both as the aerosol/gas modifies the cloud microphysics and the cloud modifies the aerosol and gases.

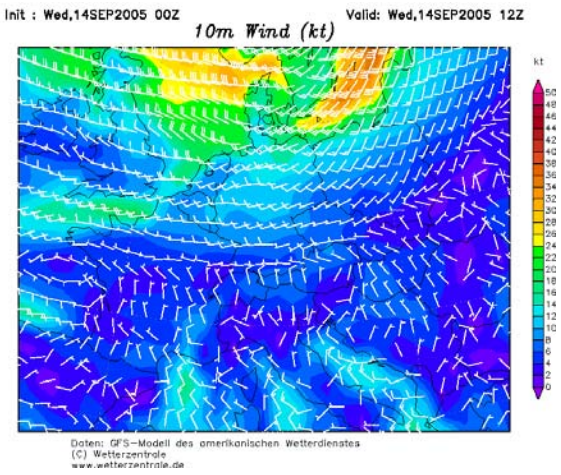
Sortie Location:
In the London plume in an area of low cloud to the SE of London in the Thames estuary and over Kent and into the English Channel.

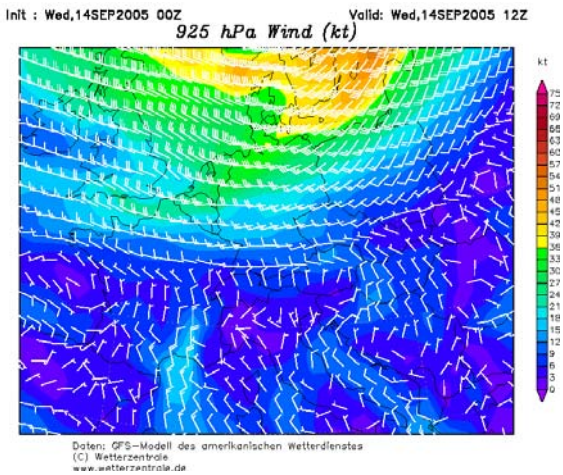
<u>Weather conditions:</u>

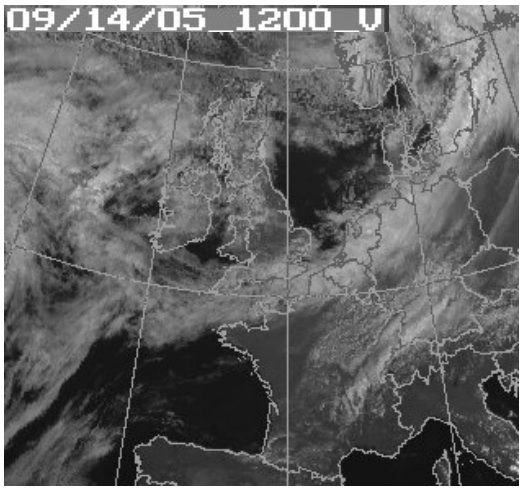


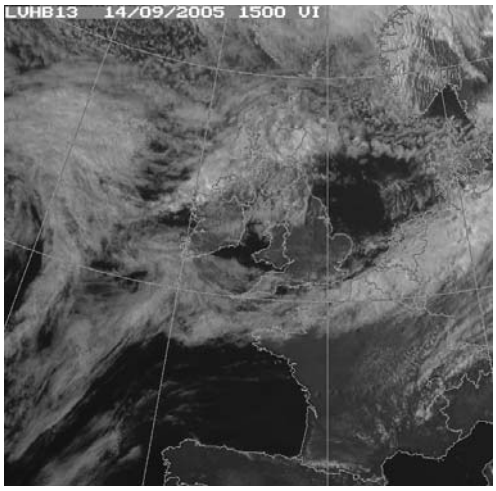


A low pressure system situated to the north of the British Isles over night moved across the North Sea towards Scandinavia during the day. A trailing frontal system consisting of a warm front closely followed by a cold front associated with this low moved south-eastwards across the SE of England during the mid to late morning period, bringing the expected cloud to the operational region around midday. During the early afternoon this cloud continued to move slowly further south towards the continent. The associated winds previously forecasted to be NNW were actually found to be more from the west during this period. There was no precipitation associated with these weakening frontal features at any time during the day, making them ideal for the purpose of this CLOPAP study.









Flight Summary

Following takeoff at 09:52:12z a NOxy calibration was carried out during transit at FL110 to point 40 off the NE coast of East Anglia. Some minor problems with CO flow rates were also sorted out during this period. Because of the possibility of cloud cover down to low levels further south, it was decided to carry out the profile descent P1 to 500ft in this area. Once at low level, Run 1 at 500ft was started progressing south from point 40 towards point 41. A CCN spectrum was produced in this "non London plume" air, but the AMS reported "aged organic" aerosol, and NOxy and Teco reported elevated levels of NOx at times. At 10:44:30 the aircraft turned off track 40-41 to head for point A. Significant levels of NO2 NOx and SO2 were observed. Just before the end of Run 1 (at the turn at point A) a ship-plume was encountered producing a large spike in CN (16,000cm^{-3}), NO (20ppb) PCASP (10,000cm^{-3}) and ozone (photo6). Run 2 was started at point A on a heading towards point B in the first across wind leg at 500ft to determine the position of the London plume in the Thames estuary. The filters were exposed at the start of the run. The plume showed up clearly as elevated levels of SO2, NOx, CN etc. Run 2 was terminated at the north Kent coast, and Run 3 carried out on the reciprocal heading back to point A at 500'. The plume was again observed, but CO levels did not show as large an increase in either low level run as expected.

At point A, Run 4, the first in-cloud transect at 2300ft was started heading from point A to point B, and to extend this beyond point B to south of the south Kent coast. Run 4 started out just in cloud base, the FSSP was seeing drops, the 2D's and CPI not. The AMS was operated on the CVI inlet, and reported seeing "sensible" particle numbers on both AMS and CPC. After 6.5 minutes the 2DC reported seeing 175μm particles, the AMS saw substantial nitrate loadings accompanied by sulphate in the plume, Teco NOx was about 5ppb which NOxy thought about right, but there was little elevation or structure in CO. AMS reported a brief period out of plume before again seeing (after 13.5 minutes) nitrate (about 2μg/m3) and also substantial organic loading, which shortly at 3μg/m3 became higher than everything else. Ozone was also higher now at 5ppb. R4 terminated as French airspace was approached, the AMS still reported seeing a plume containing "fresh" organic. As it was not possible to descend while in cloud, it was decided to carry out a profile to determine if cloud top could be

reached. P2 was started along the reciprocal track to R4 heading north. CT was reached at 3150ft, so P2 was terminated at 4000ft, and a SLR (R5) carried out at 4000ft above CT. R5 was completed at point A, just in CT which was accompanied by a substantial rise in gas loadings.

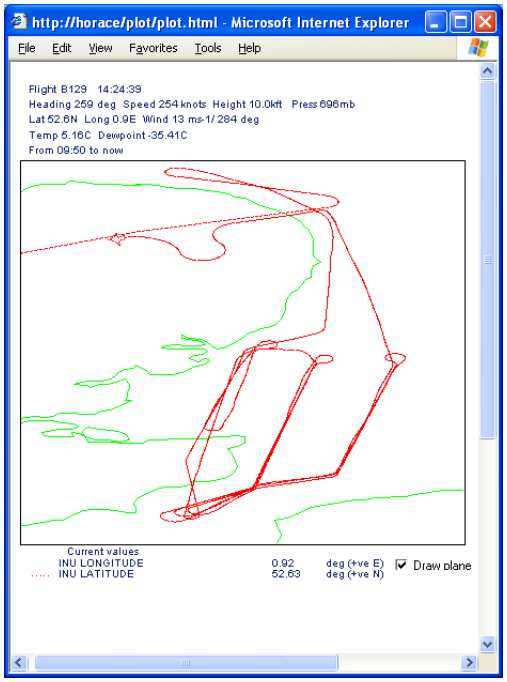
The next series of cross wind runs was started with R6 from point 41 heading south towards point 42 at 3300ft in cloud. AMS reported a 3μg/m3 loading of nitrate. However after 3.5 minutes the aircraft was above CT again so the AMS was put back on the Rosemount inlet. The FSSP was reported as having hung-up, but was back on line after 4mins of R6 (having possibly lost up to 10mins of data – mostly above CT). The cloud was appearing to be burning off – or moving further south, so R6 was terminated in order to drop to 2700ft into cloud again and to continue on as R7 to point 42 (turning right at 12:04:06 towards the endpoint/start point of R4/P2 over the English channel). Having reached the endpoint of R4, the aircraft turned onto the reciprocal heading back to point 42 (as R8), but at 2300ft so as to remain in cloud and to continue on to point D to start the incloud leg D to C (of the furthest set of cross wind runs) while cloud remained present. After 5mins of R8 AMS reported having lost its airbeam signal (found later to be a chopper servo motor failure).

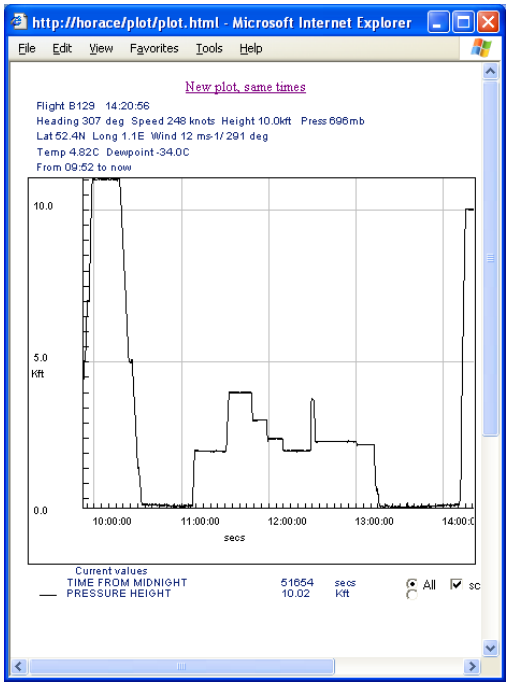
The aircraft was near CB approaching point D where R8 was terminated and R9 started (at 12:19:08z) on the northward leg D to C. R9 was near CB for most of the run, although at many points in the run the cloud layer was very thin – sometimes less than 100ft deep. At the end of the run the aircraft ascended to enable the AMS operator to troubleshoot the instrument which was confirmed to be U/S for the rest of the mission. An attempted reciprocal in-cloud leg R10 (from C to D) was carried out at 2600ft but unfortunately the cloud was burning off rapidly and so much of R10 was out of cloud. After 6.5 minutes 2DC reported seeing large drops at the same time as the FSSP saw cloud (but CPI did not see any cloud particles). After about 10mins R10 was again above the CT of a thin cloud (only 100ft deep) but then re-entered cloud. At point D, a right turn was carried out (12:45:27) to head back towards point 42. The run was continued on to the end point of R4 (as was R7 earlier). R11 commenced after a turn onto the reciprocal heading to return to point 42. R11 ended (12:58:56z) and R12 started after a left turn at point 42 to head back on the last in-cloud leg to point 41. After a short while (13:00:22) the aircraft descended a further 100ft to try to remain in cloud. After 8mins of R12 the aircraft was again out of cloud, but NOx levels were higher (mini plume), there was a slight increase in SO2 but not in CN.

After completing R12, the aircraft descended to carry out the final below cloud legs. R13 was undertaken at 500ft going south from point 41 to 42. Very high NOx levels indicated the presence of the plume immediately. The CPC (AMS) reported 10000-11000 particles /cm3, the CNC 17000cm-3 (photo 8 RHS). Towards the end of R13, NOx, SO2 and CN levels dropped off approaching point 42 (although sharp spikes in all were still observed). O3 rose at point 42. Following a right hand turn at 42, R13 was terminated and R14 commenced as the aircraft headed towards the endpoint of R4 again, to enable sampling of any part of the plume in the English channel. R15 was carried out on the reciprocal track back to point 42 (reached at 13:39:45z), which continued on to point D. Interestingly, during the left hand turn at the end of R14/ start R15, the 2DC probe saw large particles as did the CPI – on the upward pointing wing pylon – particles not observed when flying level! The final cross track leg, R16 started following a left turn at D (13:42:58z) heading towards point C. Immediate

NOx and CN spikes were observed at the start of R16, anti-correlated with ozone. After reaching point C, R17 was carried out going to point 40. A33ppb plume of NOx was observed - corroborated by NOxy at the start of R17. At the end of R17 (14:11:05z) , the aircraft ascended in a non profile climb to FL100 to enable the final NOxy calibration during the transit flight back

A further run by run pictoral summary of the flight may be obtained from the mission scientists powerpoint file of screen dumps from flight B129





Mission Scientist's Log

MSCI KEITH BOWER CLOPAP 7

Flight No B.129..... Date 14/09/05..... Page 6... of 6...

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
13:22:57	R13	500	191		NO_2 and SO_2 dropping, CN too
13:28:50	R13	500	198	51.1/1.4E	Sharp spike in NO_2 — NO_{xy}
13:29:57 13:29:38	RB/R14	500	234	51.0/1.4E	Rise O_3 at point 42
					(O2 VOC — way down — Out of BL at
					3500' — PTRMS)
13:34 30	R14 end	500	231	50.9/1.1	turn LHT
13:36:01	R15 st	500	409	50.9/1.1	
					2D — bank — 2D saw patch
					CPI — seeing spray — some large deb around
13:39 45	R15	500	76	51.0/1.5	R14T Run Point 42 → D
13:42:54	R15/R16	500	11	51.2/1.8E	NOx spike — CN spike
13:46:22	R16	500	7	51.3/1.9E	large sharp spike in NO_{xy} NO_2
					Good anticorrelation — O_3 / NO_2
13:54:07	R16/R17	500	346	51.8/2.0	Going to point 40 from C
					33 prob total NO_2 — NO_{xy} again
14:11:05	R17 end	500		52.7/1.7E	-- Non profile climb to FL100
					CB 5200' v. 200' thick
14:15:30	NO_{xy}	FL100		52.7/1.4E	NO_{xy} cal at FL100
14:32.00	NO_{xy}	FL100			NO_{xy} cal complete
14:38:35		3900			CT (CB ~ 3000)

Mission Scientist's Log

M SCI KEITH BOWER CLOPAP 7

Flight No **B**.129..... Date 14/09/05.....

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
12:33:20	R10 st	2600	212	51.8/2.1E	C→D 13.6/11.8°C 10m/s/310° 928mb 207
					"in cloud" run – but no cloud – burning off
					– will do onward set – last in cloud
					run on return N. – then encounter on
					below cloud – in plume legs – middle +
					eastern wisp (stem?)
12:39:50	R10	2600	197	51.4/1.9E	2DC seems large drops + FSSP CPI
					seems most.
12:43 ish	R10	2600			Above CT- layer is only ~100' thick
12:43 45	R10	2600		51.2/1.8E	In Cloud again
12:45:27	R10	2600	241	51.2/1.8E	R11 at point D. AMS chopper seems dead
12:53:26	R10 end	2600		50.9/1.2E	will return to point 42 to do final undercut
-					run back to 41
12:55:18	R11 st	2600	39	50.9/1.3E	
12:58:56	R11 end	2600	7		
13 00 22	R12 st				
		2500	8	51.2/1.5	Descended into cloud.
13:07:10	R12.	2500	7	51.5/1.6.	Out of Cloud now
					NO_x – main plume after cloud – slight SO_2
					increase – CN rattles – NO_x down again
13:11 56	R12 end	2500		51.8/1.7E	– descend to do out of cloud plume runs at 500'
13:16:14	R13 st	500	~~120~~	51.7/1.6E	500 1003mb 18.26/14.7° 7m/s/249° 219
					$NO_{2/3}$ – plume – v high again 9ppb
13:18:55					10-11 000 CPC CNC 17000 cm^{-3}
13:21 43	R13	500	195	51.4/1.6E	Phot. RHS

12 59:34

Mission Scientist's Log

MSci KEITH BOWER CLOPAP 7

Flight No B.129..... Date 14/09/05 Page 4 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
11:51:03	R6 st	3300	200	51.7/1.7E	41–42 10.94/12.12° 10m/s/302° 905mb
					3 Mg NO_3
11:53:30				51.5/1.6	FFSSP – hung up – now above CT
11:54:57					Put AMS back on Rosemount
					FFSSP – back on line – lost 10 mins
11:55:58	R6.	3300	197	51.5/1.6E	AMS on Rosemount
11:56:07	R6 end				terminated to drop out cloud – which is
11:59:03				51.3/1.5	burning off... then back
11:59:17	R7 st	2700	196	51.3/1.5	Up CT again
12:01:34	R7			51.1/1.5	
12:04:06		2700	239	51.1/1.4	turning HHT to avoid French aircraft
12:09:15	R7 end	2700		50.5/1.0E	turn HHT – back under beyond end of
					15² blocks
12:11:07	R8 st	2300	35	50.8/1.2E	returning to point 42 – then will continue
					across to next (hatched) block
12:16:20					AMS – just gone mad – lost AB etc
12:18:15	R8	2300	70	51.1/1.7E	Near C6 at nearby point D (1 minute to go)
12:19:05	R8 end	2300			at point D – running to point C
12:19:19	R9 st	2300	11	51.1/1.8E	– still near C8 – also beginning up
12:21:05	R9	2300	6	51.2/1.8E	274.19° Carlin 11m/s/260 939mb
					Cloud very thin here 12:21 – lost 2D
					drops
12:28:26	R9 end	2300	8	51.7/2.0E	Climbing for AMS to flush sheath servo
					cables – pass Servo motor down – will
					then do reciprocal at 2600 C→D

Mission Scientist's Log

MSC1 KEITH BOWER CLOPAD 7

Flight No **B**...129..... Date ...14/09/05.....

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
11:16:50	R4	2300	199	51.5/1.3E	178μm – 2DC particles
					AMS – substantial NO_3 from CVI
					– SO_4 too
					– NO_{3y} NO_3 – 5ppb from NO_2 TEO
					CO little structure – not – dropped below 100
					PCASP turned today
11:18:36	R4				AMS reporting out of plume
11:19:53	R4				AMS / Chem – back in plume
11:23:40	R4	2300	179	51.1/1.1E	AMS seeing Org now
11 24:01	R4				AMS seeing NO_3^- now 2μg
					Chem – O_3 higher – 5ppb higher
					939 mb 12.27/13.72 10m/s/295° 21Kts
11:25 15	R4	2300	178	51.0/1.2	AMS seeing 3μg Org now – more than enough
					elsewhere.
					AMS – still seeing plume – fresh stuff
11:26:25	R4 end	2300		50.8/1.2E	Aerosol boundary – cannot descend to below
					cloud while in cloud – ∴ will turn and
					profile now
11:30:44	P2 st	2300–6000	3	50.9/1.1E	Profile
		3150			CT.
11:32:46	P2 end	4000'	2	51.0/1.2E	13.04°/7.99° 11m/s/288 876mb 21Kts
	R5 st				NO_{2L} – SO_4 flat – O_3 v.v. – slight ↑ CO
11:46:07	R5 on	4000'		51.8/1.4E	Just hit cloud at end of Run 4
					In CT's – substantial rise in gases
11:49:40		3300		51.9/	At CB – so do next run here

Mission Scientist's Log

MSCI KEITH BOWER CLOPAD 7

Flight No B.129..... Date ..14./09/05..... Page 2 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
10:43:20	R1	500'	186	52.1/1.7E	OPC ~ 2000 CNC = 8000-9000
					17.12/14.28° 10m/s/245° 1000.2mb 21Hz
10:44:30	R1	500'			turn off 40-41 → to ease down to Ox.
					Sig mixed NO_2 NO_x, SO_2
					Boat Plume - Photo
10:46:53					CN, PCASP NO (½ multiple NO_{2y})
					O_3 / 10,000 cm^3 20 ppb
10:49:06	R1 end	500'			16000 cm^3
10:49:45	R2 st	500'			Filters Started, Core Chem Cals done, WAS
10:51:20	R2	500'			CO, NO_x reacted
					SO_2 & raw too
					QNH Manston 1022
10:56:26	R2 end	500'		54.4/1.2E	LHT 16.92°/14.67° 9m/s/265° 1003mb
10:57:47	R3 st	500	6	51.4/1.3E	
11:01:50					SO_2 NO_x KNB - CO didn't peak as much
					CN going Up
					PCASP ~ 1000 cm^{-3} - no increase in plume
11:07:29	R3 end	500'		51.9/1.4E	Climbing to 2300 so as to continue run
					across Kent
11:09:20	level	2300			just in CB
11:10:36	R4 st	2300	210	51.9/1.4E	FSSP seeing dross - CPI not ⇒ small
11:12:55					AMS - seeing particulate H_2O
	R4				↳ CVI inlet
	R4				2D - not seeing particles on 2D's -
11:15:40	R4				- mainly in cloud - so follows at

AMS - seems sensible shift (PIC too) from CVI

Mission Scientist's Log

MSCI KEITH BOWER CLOPAP 2

Flight No B.129..... Date ...14/09/05..... Page 1 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
10:50:12	BST	0			T/O RW 21
(Time check	BST =	Morocco + 1hr)			
					CB: 1850 ft CT ~ 2600 - 2900'
09:58:47	NOxy	FL110	57	53.2/0.1N	level at 11000' - NOxy Cal Start
10:08:30		FL110	65	52.6/0.9E	Problem with CO flare at moment
					2.51°/-30.73° 11m/s/289° 669mb 259kt
10:16:37					NOxy Cal complete
✓ 10:17:30	P1 st	FL110 ↓	288	52.8/1.7E	14 m/s/293°, Profiling down here - because it
		to 5000' Rad			is clear - can always do a P ascent through
					cloud in strat area
					~ 6500 - PCASP conc ↑ order magnitude
					- dropped off now.
✓ 10:23:55	P1 int	FL50		53.0/1.1E	Interrupt to turn to continue on reciprocal.
10:25:56	P1 rec	FL50→	113	53.0/1.2E	(Cloud T here looks to be 400-500' below us)
					Photo 1 RHS of BL top. - Cloud Capped
	P1	FL30			Photo 2, 3 - Cloud level
		2000			NOx spike - PCASP conc ↑
10:30.07	P1 in	1500	142	52.8/1.6E	14.56/12.52° 14m/s/260 960 mb
10:30:43	P1 rc				
10:31.45					Point 40 leaving P40 → P41
10:32:50	P1 end	500	177	52.7/1.8	12 m/s/290° 18.56/13.92° 1002mb 220
	R1 st				background CCN spectrum
					Photo 4, 5 RHS - Wind Farm
					Aged Org Ae, - Track scan change at 900
					Elevated NOxy NOx - above 400

(Nevzorov - calibrated 10:12)

CORE CHEMISTRY FLIGHT LOG FOR FLIGHT FOLDER

Flight Number : B129
Date : 14/9/05
Operator and contact info : Ruth Purvis (rupu@faam.ac.uk)

Problems with Instruments

CO	**None**
O_3	**None**
NO_x	**Unable to perform good zeros pre flight**
SO_2	**CEH instrument**
TDLAS	**N/A**
WAS	**N/A**

CO Calibrations

A full calibration lasts approx three minutes, it consists of a cal and a zero
Shorter (quick cals) are sometimes done at low level which is calibration only

Time (GMT)	Level	Comments
9.:59 –10 :02	FL110	
10:04	FL110	
10:12 – 10:15	FL110	
	500ft	Time missing
11:09 –11:12	2300ft	In cloud leg
11:33	4000ft	Quick cal full cal required
11:33	4000ft	
11:49	3300ft	Quick cal, no cal required
12:10 – 12:13	2300ft	
12:32		Quick cal, full cal required
12:33 – 12:36		
13:34 – 13:37	500ft	

CLOUD PHYSICS LOG

Flight No. B129 **Date: 14/09/05** **Operator:JT** **Page 1 of 5**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
09:50											Windows unable to save data for the
											File D: B129_FFSSp_House_1.hse
											The data has been lost. This error
											May be caused by failure of your
											Computer hardware or network
											Connection. Please try to save this
											File elsewhere
											It appears that all the D: drive
											Files have diappeared! Cant access
											Any using windows explorer
10:04:50											Rebooted and all files are accessible
10:05:00											Hse & raw files del. FSSP restarted
1				Not requested							
10:17:30	20	0.07	0		0	0	0	0	0	0	P1 decent 11000ft
10:18:39	7..34	0.07	0		0	0	0	0	0	0	10000 ft
10:19:42	5.2	0.07	0		0	0	0	0	0	0	9000ft
10:20:45	124	0.06	0		0	0	0	0	0	0	8000ft
10:21:52	7.9	0.06	0		0	0	0	0	0	0	7000ft
10:22:49	3.3	0.06	0		0	0	0	0	0	0	6000ft
10:23:52	1.8	0.06	0		0	0	0	0	0	0	5000ft P1 interrupt
10:25:58	402	0.06	0		0	0	0	0	0	0	P1 restart 5000ft
10:27:12	16.95	0.06	0		0	0	0	0	0	0	4000ft
10:28:26	240	0.08	0		0	0	0	0	0	0	3000ft
10:29:30	589	0.09	0		0	0	0	0	0	0	2000ft
10:30:10	432	0.09	0		0	0	0	0	0	0	1500ft interrupt P1
10:30:44	413	0.09	0		0	0	0	0	0	0	1500ft restart P1
10:31:33	419	0.09	0		0	0	0	0	0	0	1000ft
10:32:53	515	0.09	0		0	0	0	0	0	0	End P1 500ft Start run 1
10:34:00	453	0.08	0		0	0	0	0	0	0	
10:36:00	570	0.09	0		0	0	0	0	0	0	
10:38:00	625	0.09	0		0	0	0	0	0	0	

CLOUD PHYSICS LOG

Flight No. B **Date:** **Operator:** **Page 2 of 5**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
10:40:00	603	0.09	0		0	0	0	0	0	0	DAU 6s slow
10:42:00	608	0.08	0		0	0	0	0	0	0	
10:44:00	648	0.09	0		0	0	0	0	0	0	
10:46:00	712	0.09	0		0	0	0	0	0	0	Passed by ships plume
10:48:00	868	0.08	0		0	0	0	0	0	0	
10:49:06	691	0.09	0		0	0	0	0	0	0	end run 1
10:49:45	715	0.09	0		0	0	0	0	0	0	Start run 2 500ft
10:51:00	720	0.09	0		0	0	0	0	0	0	
10:53:00	683	0.09	0		0	0	0	0	0	0	
10:55:00	714	0.09	0		0	0	0	0	0	0	
10:57:00	788	0.09	0		0	0	0	0	0	0	
10:58:27	943	0.09	0		0	0	0	0	0	0	End of run 2
10:59:49	818	0.09	0		0	0	0	0	0	0	Start of Run 3 500ft
11:01:00	834	0.09	0		0	0	0	0	0	0	
11:03:00	739	0.09	0		0	0	0	0	0	0	
11:05:00	737	0.09	0		0	0	0	0	0	0	
11:07:00	636	0.09	0		0	0	0	0	0	0	
11:07:24	754	0.09	0		0	0	0	0	0	0	End run 3
11:10:39	406	0.14	121		0	0	0	0	0	0	Start run 4 2300ft
11:12:00	451	0,09	213		0	0	0	0	0	0	
11:14:00	614	0.09	282		0	0	0	0	0	0	
11:16:00	391	0.11	376		1	175	1	0	0	0	
11:18:00	136	0.18	631		0	0	0	0	0	0	
11:20:00	502	0.18	801		37	125	1	0	0	0	
11:22:00	585	0.11	1197		61	150	1	41	not	visible	
11:24:00	586	0.2	1600		92	150	1	91	streaks		
11:26:00	422	0.17	1948		296	200	1	83	200	1	
11:28:23	1796	0.19	1988		141	150	1	33	200	1	End of run 4
11:30:48	1445	0.2	1988		296	150	1	41	200	1	Start Profile 2 2300ft
11:31:43	8.3	0.06	1988		0	0	0	0	0	0	3000ft
11:32:47	26	0.06	1988		0	0	0	0	0	0	4000ft end of P2 start run 5
11:34:00	44	0.06	1988		0	0	0	0	0	0	0

CLOUD PHYSICS LOG

Flight No. B **Date:** **Operator:**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
11:36:00	36	0.06	1988		0	0	0	0	0	0	
11:38:00	48	0.06	1988		0	0	0	0	0	0	
11:40:00	38	0.06	1988		0	0	0	0	0	0	Cpi nematode 220um
11:42:00	74	0.06	1988		0	0	0	0	0	0	
11:44:00	28	0.06	1988		0	0	0	0	0	0	
11:46:006	1352	0.19	1988		4.5	25	1	175	Streaks	1	End run 5
11:51:05	305	0.18	1988		0	0	0	0	0	0	Run 6 3300ft
11:53:00											FFSSP frozen, not incrementing
											Logging program restarted
											Possibley happened at 11:30:00
											Only noticed so late as out of cloud
11:57:00	26	0.06	0		0	0	0	0	0	0	
11:58:07	57	0.06	0		0	0	0	0	0	0	End of run 6
11:59:15	260	0.07	0		0	0	0	0	0	0	Start run 7 2700ft
12:01:00	617	0.17	146		17	175	1	0	0	0	
12:03:00	769	0.18	344		78	100	1	0	0	0	
12:05:00	1206	0.2	695		189	125	1	16	streaks	1	
12:07:00	1065	0.19	1095		163	125	1	58	streaks	1	
12:09:15	2226	0.19	1433		253	250	1	100	200	1	Ernd of run 7
12:11:07	1477	0.18	1860		174	175	1	75	200	1	Start run 8 2300ft
12:13:00	1206	0.18	2212		230	175	1	41	200	1	
12:15:00	814	0.18	2522		346	200	1	25	200	1	
12:17:00	590	0.18	2876		44	125	1	0	0	0	
12:19:19	478	0.12	3084		36	100	1	0	0	0	End run 8 start run 9 2300ft
12:21:00	684	0.17	3441		24	125	1	0	0	0	
12:23:00	218	0.08	3608		0	0	0	0	0	0	
12:25:00	492	0.09	3611		0	0	0	0	0	0	
12:27:00	751	0.07	3611		0	0	0	0	0	0	
12:28:28	641	0.08	3611		0	0	0	0	0	0	End of run 9
12:33:20	637	0.07	3944		0	0	0	0	0	0	Start run 10 2600ft
12:35:00	500	0.08	3944		0	0	0	0	0	0	
12:37:00	417	0.09	3944		0	0	0	0	0	0	

CLOUD PHYSICS LOG

Flight No. B **Date:** **Operator:** **Page 4 of 5**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
12:39:00	247	0.17	4047		2.5	25	1	0	0	0	
12:41:00	126	0.12	4340		0	0	0	0	0	0	
12:43:00	186	0.08	4370		0	0	0	0	0	0	
12:45:00	690	0.18	4706		27	100	1	0	0	0	
12:47:00	383	0.09	5044		16	75	1	0	0	0	
12:49:00	700	0.14	5289		88	200	1	8	200	1	
12:51:00	524	0.1	5470		41	75	1	0	0	0	
12:53:27	332	0.17	5690		25	150	1	66	200	1	End of run 10
12:55:19	322	0.2	5891		236	175	1	41	streaks	1	Start run 11
12:57:00	377	0.16	6059		176	125	1	0	0	0	
12:59:34	366	0.08	6167		0	0	0	0	0	0	Run 11 terminated run 12 started
13:01:00	233	0.2	6225		0	0	0	0	0	0	Drop down to 2500ft
13:03:00	600	0.1	6427		0	0	0	0	0	0	
13:05:00	864	0.07	6593		0	0	0	0	0	0	
13:07:00	749	0.07	6596		0	0	0	0	0	0	
13:09:00	360	0.08	6569		0	0	0	0	0	0	
13:11:00	578	0.09	6569		0	0	0	0	0	0	
13:11:56	514	0.09	6569		0	0	0	0	0	0	End of run 12
13:16:16	731	0.09	6569		0	0	0	0	0	0	Start of run 13 500ft
13:18:00	731	0.08	6569		0	0	0	0	0	0	
13:20:00	876	0.09	6569		0	0	0	0	0	0	
13:22:00	880	0.08	6569		0	0	0	0	0	0	
13:24:00	849	0.09	6569		0	0	0	0	0	0	
13:26:00	872	0.09	6569		0	0	0	0	0	0	
13:28:00	889	0.09	6569		0	0	0	0	0	0	
13:29:57	849	0.09	6569		0	0	0	0	0	0	End run 13 start run 14
13:31:00	798	0.09	6569		0	0	0	0	0	0	
13:33:00	791	0.09	6569		0	0	0	0	0	0	
13:34:32	706	0.09	6569		0	0	0	0	0	0	End of run 14
13:36:05	694	0.09	6599		0	0	0	0	0	0	Start of run 15
13:38:00	739	0.09	6600		0	0	0	0	0	0	
13:40:00	767	0.09	6601		0	0	0	0	0	0	

CLOUD PHYSICS LOG

Flight No. B **Date:** **Operator:** **Page 5 of 5**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
13:42:00	889	0.09	6601		0	0	0	0	0	0	
13:43:26	725	0.09	6601		0	0	0	0	0	0	End run 15 start run 16
13:45:00	778	0.09	6601		0	0	0	0	0	0	
13:47:00	788	0.09	6601		0	0	0	0	0	0	
13:49:00	749	0.09	6601		0	0	0	0	0	0	
13:51:00	992	0.09	6601		0	0	0	0	0	0	
13:53:00	684	0.09	6602		0	0	0	0	0	0	
13:54:18	653	0.09	6602		0	0	0	0	0	0	End run 16 start run 17
13:56:00	684	0.09	6602		0	0	0	0	0	0	
13:58:00	677	0.09	6602		0	0	0	0	0	0	
14:00:00	736	0.09	6602		0	0	0	0	0	0	
14:02:00	738	0.09	6602		0	0	0	0	0	0	
14:04:00	400	0.09	6602		0	0	0	0	0	0	
14:06:00	376	0.09	6602		0	0	0	0	0	0	
14:08:00	439	0.09	6602		0	0	0	0	0	0	
14:10:00	387	0.09	6602		0	0	0	0	0	0	
14:11:05	361	0.09	6602		0	0	0	0	0	0	

CLOUD PHYSICS PROCESSING LOG

Flight number: B129
Date: 14/09/2005

B) FFSSP PROCESSING		
Processing Stage	Completed	Comments
1) Transfer *.txt files from DVD to PC B129_FFSSP_hh.txt for each hour of data B129_FFSSP_HVMS.txt		FOR PMSDATA READ SEADAS_DATA:[SEADAS_DATA] THROUGHOUT
2) FTP the files (ascii) from the PC to the directory PMSDATA: on FLOODS		
3) RUN MRFB:[PMS.FAST_FSSP]FSSP_EXTRACT_TAS a) Flight number: B129 b) Path name: MFDDATA:B129_MFDX c) Output directory: PMSDATA: d) Start time: 0 if unknown e) End time: 240000 if unknown	10/03/06	
4) RUN MRFB:[PMS.FAST_FSSP]FFSSP_PROCESS_TXT a) Flight number: B129 b) Directory: PMSDATA: c) TAS in processing: Y d) Vel threshold (clicks) 0 e) Calibration file: Use the most recent calibration file. Format FFSSP_CALddmmyyyy.txt Calibration files to be stored in MRFB:[PMS.FAST_FSSP] f) Adjust FFSSP time Y/N g) If Y, enter value to add to data time (seconds)		Note the calibration file used Nearest in time is: FFSSP_CAL20092005.TXT Yes only if gross errors occur in FFSSP time eg; ~ 1hour
5) In PVWAVE a) enter: !path=!path+',mrfb:[pms.proc]' Note that the comma before "mrfb" is important! b) write_procffssp_to_m5,'pmsdata:B129_procffssp.dat', 'mfddata:B129_mfdX','pmsdata:B129_m5procffssp',/auto 1st argument is output file from 5) 2nd argument is the MFD 3rd argument is the new FFSSP data file in M5 format	13/03/06	Note the correction applied to FFSSP time by /auto 10 sec added by /auto
c) exit		
6) MODIFY a) Modifying datasets: pmsdata:B129_m5procffssp b) Datset: mfddata:B129_mfdX c) New dataset: Enter updated MFD name d) Parameter description file: leave blank to use default	13/03/06	
7) CHECKS:		
i) FFSSP and JW/Nevzorov LWC – are they correctly synchronized in time?		OK. FFSSP and JW look in good agreement
ii) If not, may be necessary to repeat 5b) using addt=x keyword. This adds x sec to FFSSP time.		
iii) Alternative at 5b) is to use ,auto=602 or auto=605 to align FFSSP with Nevzorov LWC or TWC.		

CLOUD PHYSICS PROCESSING LOG

Flight number: B129
Date: 14/09/2005

C) 2D PROCESSING		
Processing Stage	Completed	Comments
1) Transfer B129.dat file from CD/DVD to PC		
2) Zip up file on PC (B129.zip)		
3) FTP the zipped file (binary) from the PC to the directory SEADAS_DATA:[SEADAS_DATA] on FLOODS		
4) Log on to FLOODS		
5) unzip SEADAS_DATA:[SEADAS_DATA]B129.zip		
6) In PVWAVE i) !PATH=!PATH+',MRFB:[PMS.PROC]' ii) CONVERT_SEADAS_FILE a) Input file: SEADAS_DATA:[SEADAS_DATA]B129.dat b) Output file: SEADAS_DATA:[SEADAS_DATA] B129_seadas.dat iii) exit	13/03/06	Note the number of bad block reads and/or final numbers of blocks read & written 45136 read 45132 written 3 bad reads
7) run MRFB:[PMS.SEADAS]READM200_FILE a) Default directory: PMSDATA: b) Flight number: B129 c) Disk file name: SEADAS_DATA:[SEADAS_DATA] B129_seadas.dat d) Comment string: e) Start time: 0 if unknown f) End time: 240000 if unknown g) Read 2DC: Y h) Read 2DP: Y i) Secondary data Y j) FSP-SYNC: Y k) cmd.str: Y l) Auto time correction: N m) Full length secondary: N	13/03/06	Don't worry about lots of FORTRAN run-time errors as long as the program continues. These are format errors when writing to ascii files. Data ends about 141400
8) 2D image display and printing Quick look at image blocks if required In PVWAVE i) !PATH=!PATH+',MRFB:[PMS.PROC]' i) WAVE> IMAGEDISPLAY a) 2D directory name: PMSDATA: b) Flight number: B129 c) IWC plot: N d) Select probe: (1) 2DC (2) 2DP e) Start time: 0 if unknown f) End time: 240000 if unknown g) Time interval (sec): 0 for every image block nominal 5 sec		This section is optional Features to look for: 1) Noise on 2D-P – does it affect non-edge diodes (with potential to create spurious particle counts)? 2) Can you identify a dominant particle habit for the whole flight (eg. drops or crystals) 3)

Preparation of imagery for Core data product		
iii) WAVE> auto_image		
a) 2D directory name: PMSDATA:		
b) Flight number: B129		
c) Enter date: YYYYMMDD		
d) Enter start time 0 if unknown	090000	
e) Enter end time 240000 if unknown	141400	
f) Enter time interval (sec) between successive imaged blocks		
10	10	2DP no meaningful imagery
iv) exit PVWAVE Creates files	PMSDATA:	FAAM_YYYYMMDD_R0_B129_2Dx-IMAGES.PS
ftp *.PS files from PMSDATA: to PC		
Load each into Ghostview or other pdf-converter		
Output as pdf file (70 dpi resolution) and append name prefix of CORE-CLOUD-PHY_ to converted files		
9) run MRFB:[PMS.SPEC2D.AUTO]PROCESS2D_AUTO		If program crashes at a certain Time, for any reason, re-run With that time as the new end.
a) Flight number: B129		
b) Directory: PMSDATA:		
c) File generation: Hit enter		
d) Time correction: Time offset of the 2D data		
e) TAS: Y		
f) MFD directory: MFDDATA:B129_MFDX		
g) Probe number: (1) 2DC (2) 2DP (0) Both 0 unless either probe known to be faulty	1	2DP not processed
h) Start time: Take-off or 0 if unknown	100000	Look for realistic times in Flight Summary file or Cloud Phys operator log.
i) End time: Landing or 240000 if unknown	141400	
j) Nominal averaging: 0.2 seconds for conversion to M5	0.2	
k) Particle type: 8 if known to be in ice cloud 11 if known to be in water cloud 8 if known to be in mixed-phase 8 if unknown	11	Note the particle type
l) Coefficient choice: 2	2	
m) Output root filename: PMSDATA:B129_PROC2D	13/03/06	complete
10) In PVWAVE		Note: This will run quicker if you specify correct start / end times at 9h) and 9j).
i) enter: !PATH=!PATH+',MRFB:[PMS.PROC]' Note that the comma before "mrfb" is important!		
ii) WRITE_PROC2D_TO_M5, 'PMSDATA:B129_PROC2D.DAT', 'PMSDATA:B129_M5PROC2D'		
iii) exit		
11) MODIFY		
a) Modifying datasets: pmsdata:B129_m5proc2D		
b) Datset: mfddata:B129_mfdX		
c) New dataset: Enter modified MFD name		
d) Parameter description file: leave blank to use default		
12) CHECKS:		
i) Is 2DC/2DP IWC of comparable magnitude and well-correlated with Nevzorov TWC?		

CLOUD PHYSICS PROCESSING LOG

Flight number: B129
Date: 14/09/2005

D) PCASP PROCESSING		
Processing Stage	Completed	Comments
1) Complete stage 7) in 2D processing Ensures B129_FSP.DAT containing raw PCASP data is written to directory PMSDATA:		
2) run MRFB:[PMS.PCASP]PROCPCASP_NEW a) Flight number: B129 b) File name: PMSDATA:B129_FSP.DAT c) Root output name: PMSDATA:B129_PROCPCASP Produces PMSDATA:B129_PROCPCASP.DAT (binary) PMSDATA:B129_PROCPCASP.OUT (ascii) d) Minimum size channel: Default = 1 If smallest size channel are known to be noisy the value of the highest noise free channel to be entered here e) Calibration volume flow rate: Use the most recent value. Calibration files to be stored in **????** Entering zero gives default value = 1.0 cm3/sec f) Time correction: Same value as used in 2D processing stage 9 d) g) Start time: Take-off or 0 if unknown h) End time: Landing or 240000 if unknown	 1 1.0 0 094500 141400	Note the min size channel Note the volume flow rate Look for realistic times in Flight Summary file or Cloud Phys operator log.
3) In PVWAVE i) enter: !PATH=!PATH+',MRFB:[PMS.PROC]' Note that the comma before "mrfb" is important! ii) write_procpcasp_to_m5,'pmsdata:B129_procpcasp.dat' ,'pmsdata:B129_m5procpcasp' iii) exit	 13/03/06	Note: This will run quicker if you specify correct start / end times at 2g) and 2h).
4) MODIFY a) Modifying datasets: pmsdata:B129_m5procpcasp b) Datset: mfddata:B129_mfdX c) New dataset: Enter modified MFD name d) Parameter description file: leave blank to use default	 MFDB 13/03/06	 complete

CLOUD PHYSICS PROCESSING LOG

Flight number: B129
Date: 14/09/2005

E) NetCDF file preparation and ftp to BADC		
Processing Stage	Completed	Comments
1) Run TAREXEC:MFD_BADC		
For inputs below, just press ENTER to use defaults		Defaults in [square brackets]
a) MFD to convert: MFDDATA:B129_MFDX b) version number for BADC: r[0] c) Names file: TARDIS_ROOT:[CALTEXT.NETCDF]CP_NAMES.TXT d) Directory: [DATA_ROOT:[NETCDF]] e) File prefix: [core-cloud-phy_faam] f) File suffix: [ ] g) File for output: [core-cloud-phy_faam_yyyymmdd_rm_B129.nc]	13/03/06	As from 4c) above default NOT the default default default default Default name is generated
2) Ftp transfer to BADC - stage 1) creates two files: - core-cloud-phy_faam_yyyymmdd_rm_B129.nc - core-cloud-phy_faam_yyyymmdd_rm_B129.txt The *.txt file should be renamed to core-cloud-phy_faam_yyyymmdd_rm_B129_descrip.txt but this cannot be done on VMS as the filename is too long You should do it if the file is first transferred to a PC, or after it has been uploaded to the appropriate “incoming” directory at BADC a) ftp ftp.badc.rl.ac.uk b) login with username and password c) cd /incoming/faam/campaign-processed-core d) copy *.txt file as ascii e) copy *.nc and *2D-IMAGES.pdf files as binary	13/03/06	complete

F) BACKUP PROCEDURES		
Processing Stage	Completed	Comments
1) Backup the intermediate files created in PMSDATA: a) zip “-V” outdir:B129.zip PMSDATA:B129*.* Note that the uppercase “-V” option is important to preserve the VMS file characteristics when files are restored from this zip file.	13/03/06	Note destination directory “outdir” Outdir = CLOUD_PHYS:[BROWN.PMSZIP]

CLOUD PHYSICS PROCESSING LOG

Flight number: B129
Date: 14/09/2005

A) Raw data transfer to BADC		
Processing Stage	Completed	Comments
1) Transfer raw data files from DVD to PC B129_FFSSP_hh.txt for each hour of data B129_FFSSP_HVMS.txt B129_FFSSP.raw B129_FFSSP_House_1.hse etc. 2) Zip these file on the PC -output file: core-cloud-phy_faam_yyyymmdd_r0_B129_rawffssp.zip		
3) Transfer SEADAS B129.dat file from CD/DVD to PC 4) Zip up file on PC (B129.zip) - rename B129.zip to core-cloud-phy_faam_yyyymmdd_r0_B129_rawseadas.zip		
5) ftp to BADC a) ftp ftp.badc.rl.ac.uk b) login with username and password c) cd incoming/faam/campaign_raw d) bin e) put core-cloud-phy_faam_yyyymmdd_r0_B129_rawffssp.zip f) put core-cloud-phy_faam_yyyymmdd_r0_B129_rawseadas.zip		Binary data transfer

Filter Sampling Log

Flight No: B129 **Date: 14/9/05** **Operator:papj**

Run No	Disk No 1	Disk No 2	Disk No 3	Top/ Bottom	Time On	Time Off	Flight Run	Accum Vol [l]	Comments
1					105004	111545		2671	Upper
13					131616	142226		5992	lower

FLIGHT NUMBER: B129	DATE: 14/09/05	OPERATOR: SWH.	Page 1 of 2
PROJECT: CLOPAP			

CCN LOG

ALLEVIATOR GMT		HEIGHT	TEMP INLET			STATIC				REMARKS
ON	OFF			1	2	3	4	5		
103403	103445	500ft		1.75	2.5	3.5	4.25	5.5		292.7819°K
				0.48	0.68	1.02	1.38	2.01	S	
			17.61	1234	1602	1811	2258	2547	D	1002.096 P
				489	489	501	504	510	B	
				2314	2318	2338	2351	2345	R	
				1008.1	1008.2	1008.2	1008.3	1008	P	
				0.48	0.67	1.06	1.35	1.99	S	
				869	1003	1355	1494	2723	D	
	As above		16.69	439	439	448	450	498	B	
				2326	2328	2331	2334	2345	R	
				1008.1	1008.1	1008.4	1008.4	1008.6	P	
				1.75	2.5	3.5	4.25	5.5		
104980	105030			0.48	0.67	1.04	1.36	1.96	S	
		500ft		854	1459	2548	3137	4091	D	
			16.97	452	452	460	462	470	B	
				2372	2373	2399	2421	2434	R	
				1008.2	1008.5	1008.5	1008.2	1008.4	P	
113249	113328			0.46					S	prob stable
		4000ft		409					D	
			17.8	254					B	and profile
				2306					R	
				1001.3					P	
				1.75	2.5	3.5	4.25	5.5		
125315	125358			0.46	0.64	1.01	1.34	1.97	S	
		2600ft		868	1244	1811	2277	2824	D	
			17.4	254	254	255	260	261	B	
				2426	2428	2430	2434	2435	R	
				1009.9	1009.8	1009.9	1009.6	1009.6	P	
		2600ft		0.47	0.67	1.01	1.31	1.89	S	
				883	1197	2192	2410	2489	D	
			28.2	250	250	258	258	258	B	
				2425	2427	2429	2432	2432	R	
				1009.4	1009.7	1009.7	1009.8	1009.8	P	
				1.75	2.5	3.5	4.25	5.5		
~~132607~~	~~132648~~								S	would
131618	131648								D	
									B	NOT
				2347					R	
				1010.4					P	Stabilize
132404	132443			0.47	0.68	1.01	1.32	1.91	S	
		500ft		1933	2257	3501	3981	4092	D	
			17.4	295	295	310	309	312	B	
				2355	2360	2365	2383	2395	R	
				1010.4	1011.1	1010.9	1011.1	1011.1	P	

FLIGHT NUMBER: B129	DATE: 14/09/05	OPERATOR: SWA	Page 2 of 2
PROJECT: CLOPAP.			

CCN LOG

ALLEVIATOR GMT		HEIGHT	TEMP INLET			STATIC				REMARKS
ON	OFF			1	2	3	4	5		
133038	133515	500ft		1.75	2.5	3.5	4.25	5.5		
				0.46	0.67	0.99	1.30	1.91	S	
				1482	2219	2622	3095	4092	D	
			29.20	282	282	295	299	302	B	
				2394	2400	2411	2419	2420	R	
				1011.4	1008.3	1010.0	1010.6	1010.5	P	
134410	134451	500ft		0.47	0.68	1.01	1.31	1.94	S	
				1841	2241	2583	3204	3955	D	
			29.29	268	268	321	324	330	B	
				2405	2411	2419	2421	2424	R	
				1010.7	1009.5	1010.5	1009.5	1009.4	P	
				1.75	2.5	3.5	4.25	5.5		
135340	135421	500ft		0.47	0.68	1.00	1.31	1.91	S	
				2206	2520	3320	3987	4092	D	
			29.24	264	264	291	294	308	B	
				2413	2419	2420	2423	2430	R	
				1009.6	1009.9	1009.9	1009.8	1009.9	P	
									S	
									D	
									B	
									R	
									P	
				1.75	2.5	3.5	4.25	5.5		
									S	
									D	
									B	
									R	
									P	
									S	
									D	
									B	
									R	
									P	
				1.75	2.5	3.5	4.25	5.5		
									S	
									D	
									B	
									R	
									P	
									S	
									D	
									B	
									R	
									P	

WAS + PAN sampling summary

Flight number: B129

Date: 14/9/05

Campaign Name: C-LOPAP

Operator: Debbie O'Sullivan

Case 7, 5 and 1 available.

time	Bottle #	comments	Final pressure (bar)
		Argon cylinder 170 bar	
		Was cylinder pressure ~1100 psi	
		3 in the boundary layer on rins 2 above.	
		Time check at 9:39:30	
		Pan - Run 24 at FL 100	
		Profile Descent	
10:20		just off North Norfolk Coast	
10:31		Point 40 on map	
10:44:39		between point 41 and A	
10:49:43		point A Start of Run 2 @ 500ft	
			3.36
10:50:05	1		
			3.36
10:55:27	2		
10:58:39		end of Run 2	
10:59:46		Start of Run 3 towards Point A @ 500ft heading North	
11:01:34	3		3.35
11:03:32	4		3.35

WAS + PAN sampling summary

Flight number: .....

Date: .....

Campaign Name: .....

Operator: .....

time	Bottle #	comments	Final pressure (bar)
11:10:37		2300 ft Run 4	
11:13:17	5		3.30
11:18:26	6		3.30
11:28:23		end of Run 4	
11:30:46		Profile ascent 2 from 2300ft to 4000 ft above cloud ~~base~~ top	
11:32:44		end of Profile climb start of Run 5 at 4000 ft	
11:37:13	7		3.23
11:41:68	8		3.15
11:48:07		end of Run 5 descending to 2900 ft towards point 41	
11:51:03		Start of Run 6 3600 ft 41 → 42 In Cloud	
11:52:09	9		3.26

WAS + PAN sampling summary

Flight number: B129

Date: 14/9/05

Campaign Name: CLOPAP

Operator: Debbie O'Sullivan

time	Bottle #	comments	Final pressure (bar)
11:56:11	10	out of cloud	3.26
11:58:15		end of Run 6 at 3600 ft	
11:59:13		Start of Run 7 at 2700ft	
12:03:09	11	out of cloud (just above cloud top)	3.29
12:07:40	12	In cloud	3.28
12:09:15		end of Run 7	
12:11:08		Start of Run 8 2300 ft back towards 42	
12:13:00	13	In cloud	3.29
12:15		reached point 42 easing right towards D	
~ 12:18		reached point D heading towards C	
12:19:19		end of Run 8 and Start of Run 9 at 2300 ft.	
12:20:03	14	In cloud	3.29

WAS + PAN sampling summary

Flight number: .....

Date: .....

Campaign Name: .....

Operator: .....

time	Bottle #	comments	Final pressure (bar)
12:24:00	15		3.30
12:28:27		end of Run 9	
12:33:19		Run 10 from C → D at ~~2700~~ 2600 ft	
12:36:11	25		3.29
12:40:30	26		3.29
		after reaching D heading towards 42 in plume	
12:49:46	27	In Cloud	3.29
12:53:12	28	In Cloud	3.29
12:53:27		end of Run 10	
12:54:04	29	(accidently filled) at point 42	3.28
12:55:29		Stat of Run 11 at 2600 ft 42 → 41	
12:59:34		end of Run 11 and Stat of Run 12 just after turn + just before slight descent to 2500ft	

WAS + PAN sampling summary

Flight number: ~~B129~~ B130

Date: 14/9/05

Campaign Name: CLOPAP

Operator: Debbie O'Sullivan

time	Bottle #	comments	Final pressure (bar)
13:04:30	30		3.29
			3.28
13:07:16	31		
		End of Run 12 at 2500ft	
13:11:57			
		~~Start~~ of Run 13 at 500ft	
13:16:16		from 41 → 42	
13:23:16	32		3.34
13:26:57	~~33~~ 57		3.34
13:29		Coming up to Point 42, turning right back to Point 41 to find end of plume.	
13:29:57		End of Run 13 and start of run 14 (reciprocal of 13)	
13:3 :		End of Run 14	
13:36:20		Start of Run 15 heading back to Point 42	
	58		3.36
13:38:20			

WAS + PAN sampling summary

Flight number: .....

Date: .....

Campaign Name: .....

Operator: .....

time	Bottle #	comments	Final pressure (bar)
13:39		Point 42 turning right towards D	
13:40:38	59		3.34
13:42:12	60		3.34
13:43:26		end of Run 15 start of Run 16 at 500ft	
13:43:32	61		3.33
13:45:00	62		3.34
13:46:52	63		3.34
13:51:34	64		3.34
13:54:20		end of Run 16 at Point C and start of Run 17	
		WAS cylinder end pressure 1100 psi	

Flight Manager's Instrument Status Log

Flight No. **B** 129 Date: 14 September 2005

Instrument	Fitted	Operated	Instrument	Fitted	Operated
Navigation			**Cloud Physics**		
INU		**Y**	**Probes**		
XR5M GPS		**Y**	FFSSP		**Y**
Cruciform GPS		**N**	PCASP		**Y**
Satcom C		**Y**	2D-P		**Y**
Satcom H		**Y**	2D-C		Y
Thermometers			Cloudscope		**N**
De-Iced Temp		**Y**	SID 1		**N**
Non De-Iced		**Y**	SID 2		**N**
Heimann		**N**	HVPS		**N**
Hygrometers			CIP25		**N**
G. Eastern		**Y**	CIP100		**N**
J. Williams		**Y**			
Nevzorov		**Y**			
TWC		**Y**			
FWVS		**N**	**Racks:**		
Radiometers			INC		**N**
Upper Clear		**Y**	CCN / CNC		**Y**
" Red		**Y**	CVI		**Y**
" Silicon		**Y**			
" JO1D		**Y**	**Aerosol**		
Lower Clear		**Y**	PSAP		**N**
" Red		**Y**	Nephelometer		**N**
" Silicon		**Y**	Filters		**Y**
" JO1D		**Y**	AMS		**Y**
Large Radiometers					
TAFTS		**N**			
MARSS		**N**			
DEIMOS		**N**	**Others:**		
ARIES		**N**	NIR TDLAS		N
SWS		N	2BT O3		N
Chemistry			VACC		N
Ozone		Y	PEROXIDE		Y
SO2		Y	Formaldehyde		Y
NOX		Y	ADA		Y
CO		Y	CPI		Y
ORAC		N	NOxy		Y
PAN		Y	PTRMS		Y
PERCA		N	Bag Sampling		N
WAS		Y	Tube Sampling		N

Faults / Incidents Log

Flight No. B129
Date: 14 September 2005

Instruments

1 TWC u/s; power recycled but no effect. Status light extinguished once for a second.
2 FM's pc hung at 13:35. Reset ok
3 Core chem; CO flows erratic on transit – otherwise all ops normal
4 Cloud Physics; FFSSP fell over – restarted ok, Keyboard mouse function erratic on startup
5 CCN/filters; ops normal
6 NOxy; ops normal
7 AMS; worked until failure at ~ 12:30Z
8 PTRMS; ops normal
9 CPI; ops normal
10 WAS; ops normal
11 Mission Scientist's laptop operation now ok
12 No 'slow HORACE windows' noted during flight, updating screens ok

Aircraft

Satcom H Calls; nil

MISSING LOG SHEETS:

The following logs are not available for flight B129:

Log	Reason
CVI	No log is ever taken for CVI
ADA/CPI	No log taken or no copy left with FAAM
NOxy	No log is ever taken for NOxy
PTrMS	No log is ever taken for PTrMS
AMS	Log only of interest to instrument operator so no copy left with FAAM

VIDEO RECORDINGS:

4 x Forward Facing Cameras
4 x Rearward Facing Cameras

Digital8 video recordings from this flight reside with :

Professor Tom Choularton

Sackville Street
Atmospheric Science Research Group
Sackville Street Building
The University of Manchester
PO Box 88
Manchester
UK
M60 1QD

Tel: +44 (0)161 306 3950

E-mail: T.W.Choularton@manchester.ac.uk